

# ELECTRONIC WARFARE

Most Air Force  
ALQ-135 Jammers  
Procured Without  
Operational Testing





United States  
General Accounting Office  
Washington, D.C. 20548

National Security and  
International Affairs Division

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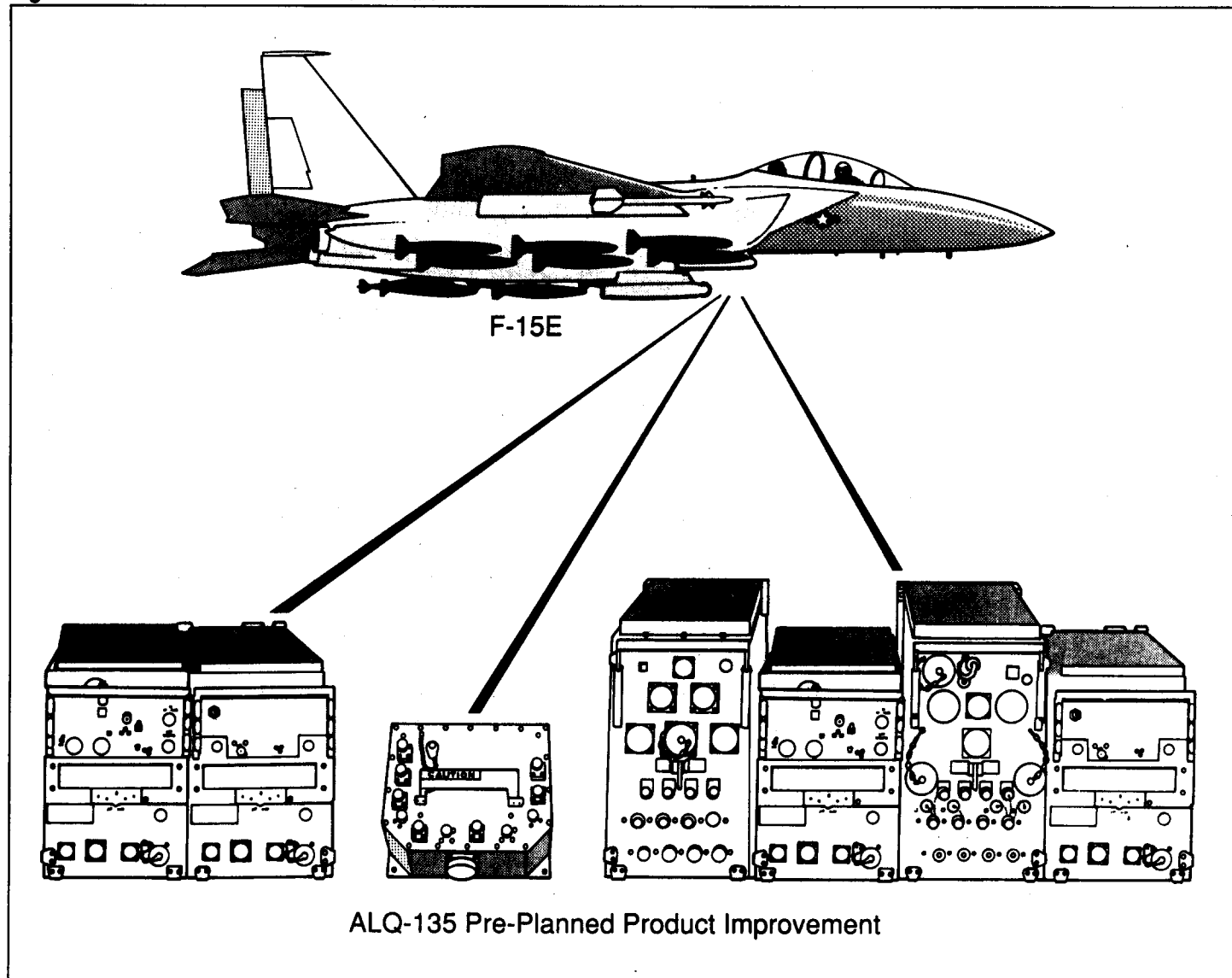
November 22, 1994

The Honorable William V. Roth, Jr.  
Ranking Minority Member  
The Honorable David Pryor  
Committee on Governmental Affairs  
United States Senate

As requested, we examined the Air Force's \$2 billion program to acquire an upgraded version of the ALQ-135 jammer. The purpose of the jammer is to protect F-15 aircraft against threat weapons by transmitting electronic signals to interfere with radars used to control threat missiles and guns. This unclassified version of a classified report being provided to you focuses on whether the Department of Defense (DOD) and the Air Force took the necessary measures to ensure that the program had demonstrated acceptable performance before the jammers were produced and deployed.

## Background

The upgraded ALQ-135 is a two-band system, designated as Bands 1.5 and 3, for use on newer models of the F-15 (see fig. 1). The designations refer to two portions of the radar frequency band covered. The older F-15C aircraft is being equipped with only the Band 3 because the original ALQ-135, which is already installed, covers the frequency band of the Band 1.5. Band 3, therefore, will provide extended frequency coverage for the F-15C. The newer F-15E, which does not have the original ALQ-135, is supposed to be equipped with Band 1.5, as well as Band 3.

**Figure 1: ALQ-135 Jammer and F-15 Aircraft**

We reported in 1990<sup>1</sup> that the Air Force had started production of several jammers, including the upgraded ALQ-135, without adequately testing their performance capability. We noted that the upgraded ALQ-135 units that had been produced were in storage because of software design problems.

<sup>1</sup>Electronic Warfare: Need to Strengthen Controls Over Air Force Jammer Programs (GAO/NSIAD-90-168, July 1, 1990).

We recommended at that time that the Secretary of Defense prohibit the award of further production contracts until operational testing provided reasonable assurance that the jammers would meet performance requirements. We also recommended that the Secretary require that adequate internal controls be established over Air Force jammer programs to ensure that the jammers were satisfactorily tested and demonstrated acceptable performance before producing and deploying them.

DOD disagreed that satisfactory performance during operational testing should be required before further production contract awards but stated that these jammers would not be allowed to proceed to full-rate production without an assessment of their operational performance. Subsequently, in the National Defense Authorization Act for Fiscal Year 1991, Congress directed that the ALQ-135 production rate not exceed minimum essential levels until the system underwent "thorough and effective" operational testing and was determined to meet or exceed all operational criteria.

DOD also disagreed that additional internal controls were needed, stating that adequate internal controls were in place to ensure that systems demonstrated acceptable operational performance before full-rate production. However, of the total planned quantity of 514, the Air Force has already procured 391 and will have procured 451, or 88 percent of the total quantity, before operational testing starts.

## Results in Brief

The Air Force has continued procurement of the ALQ-135 Band 3 despite its deficient performance, resulting in the premature deployment of systems with limited capability to protect the F-15. While developmental testing showed the Band 3 to have serious performance flaws, the Air Force has already procured most of its total program quantity without demonstrating acceptable operational performance. These performance problems are compounded by other deficiencies that are discussed in our classified report. Moreover, the Air Force has deferred further production of the Band 1.5. Information on the impact of this deferral on the F-15E's survivability has been classified by DOD.

Acquiring nearly all the Band 3s before adequate operational testing is inconsistent with DOD policy and the rationale for the requirements in the National Defense Authorization Act for Fiscal Year 1991. Furthermore, the Conference Report on the National Defense Authorization Act for Fiscal Years 1990-91 states that the conferees did not intend to condone a

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continued reapproval of low-rate initial production quantities that eventually might total a significant percentage of the total planned requirement. The poor condition of the ALQ-135 program now is a direct result of DOD's disregard of congressional expectations, its own written policy, and our recommendations.

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### **Band 3 Ineffective Against Some Threats**

Developmental testing conducted after the Band 3 entered production has shown that the system has serious performance problems. New, but preliminary, test results compiled after the draft of this report was prepared indicate some improvement in performance; however, significant problems persist. The details of these matters are classified.

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### **Most Band 3 Systems Procured in Low-Rate Production**

DOD policy governing low-rate production, as stated in DOD Instruction 5000.2, is intended to limit the acquisition of large quantities of systems until satisfactory operational testing is accomplished. Nevertheless, DOD has allowed the Air Force to procure most of its Band 3 systems without conducting any operational testing. In doing so, the Air Force has acted within the letter of the National Defense Authorization Act for Fiscal Year 1991, but not its spirit or the rationale for its requirements, and contrary to congressional expectations found in the Conference Report on the National Defense Authorization Act for Fiscal Years 1990-91.

The Fiscal Year 1991 Act limited ALQ-135 production to a rate sufficient to sustain existing production capabilities at minimum essential levels until thorough and effective operational testing had been conducted and successfully completed. Previously, in the Fiscal Year 1990-91 Conference Report, which supported revised restrictions on the uses of low-rate production, the conferees stated that they did not intend to condone repetitive low-rate production quantities that eventually total a significant percentage of the total planned procurement of a system. Despite this, the Air Force did not conduct operational testing as expected under the 1991 legislation, but continued to approve repetitive low-rate production. By the time operational testing is scheduled to start, practically all the Band 3 systems will have already been procured.

The Air Force started production of the Band 3 in 1986 while the system was in early development. Subsequently, because of the magnitude of the problems detected in developmental testing, the Air Force deferred the scheduled operational testing to mid-1995. Nevertheless, the Air Force

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continued production of the Band 3 and started deploying the systems to operational forces in 1990.

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## Much of Potential Benefit of Band 3 Operational Testing Has Been Lost

DOD's policy, DOD Instruction 5000.2, emphasizes the need for timely testing to reduce risks and to estimate system operational effectiveness and suitability.<sup>2</sup> The policy provides that operational test results are an important consideration in making key decisions to proceed with the acquisition of systems. The DOD policy further indicates that operational test results not only indicate how well a system will work, but can also identify ineffective and unreliable systems before they are produced.

However, because the Air Force will have procured most of the planned systems, the operational testing planned to start in mid-1995 will do little to reduce risk. Much of the potential benefit of operational testing has already been lost. The Air Force still needs to conduct some operational testing to determine whether the system will function effectively in a realistic operational environment. However, other aspects of the system's performance, such as its reliability, maintainability, and logistical supportability, can be assessed at the operational units to which the system has been deployed. Curtailment of planned operational testing of the ALQ-135 Band 3 could reduce test cost, currently estimated at about \$5.8 million.

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## Band 1.5 Deferral Leaves Aircraft Vulnerable

After an initial procurement of eight units, the Air Force decided in 1988 to defer further procurement of the Band 1.5 because of the problems encountered on the Band 3 program. The Air Force planned to focus on completing development of the Band 3 and then provide the Band 1.5 later. However, solving the Band 3's problems is taking much longer than expected, and the Band 1.5 is still in a deferred status. Information on the impact of this deferral on the F-15E's survivability has been classified by DOD.

According to Air Force officials, the Band 1.5 is a high priority, but currently an unfunded requirement. The Air Force estimates that completing development of the Band 1.5 would cost \$43 million and production of the required 184 units would require another \$382.6 million.

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<sup>2</sup>Operational effectiveness refers to the ability of a system to accomplish its mission in the planned operational environment. Operational suitability is the degree to which a system can be placed satisfactorily in field use considering such factors as reliability and maintainability.

The Air Force has jammer pods available that provide protection in the frequencies covered by the Band 1.5. These pods can be used by other tactical aircraft, such as the F-16. However, despite the problems with the Band 3 and the expected cost of acquiring the Band 1.5, the Air Force does not plan to use any other jammer alternatives, such as the ALQ-131 pod jammer, for protecting the F-15E aircraft. The Air Force considers the Band 1.5 the only viable option to provide the F-15E full jammer coverage.

## Recommendations

We affirm our previous recommendation that the Secretary of Defense establish adequate internal controls over all Air Force electronic warfare programs to ensure that systems are satisfactorily tested and demonstrate acceptable performance before producing and deploying them. In particular, we recommend that if the ALQ-135 Band 1.5 program is to proceed, the Secretary prohibit any further procurement of the Band 1.5 until the Air Force demonstrates satisfactory performance of the system during operational testing using the eight units it already has procured.

We also recommend that the Secretary require a cost-effectiveness analysis to determine the best approach to provide jammer protection for the F-15E. If the best approach is determined to be other than the upgraded ALQ-135, to include the Band 1.5, the Secretary should stop currently planned procurement of Band 3 systems for F-15Cs and use existing F-15E Band 3 systems to meet the F-15C requirements.

Finally, we recommend that the Secretary limit planned operational testing of the ALQ-135 Band 3 to effectiveness issues only, since most of the systems have already been procured. Data needed to evaluate the system's operational suitability characteristics, such as reliability and maintainability, can be obtained during exercises by the tactical units to which it has been deployed.

## Agency Comments

DOD concurred or partially concurred with most of the findings and recommendations in this report. In particular, DOD indicated that electronic warfare programs should be properly tested before initiating production, but acknowledged that the Air Force had procured the majority of the ALQ-135 systems without performing an operational evaluation.

With regard to repetitive low-rate production approvals that lead to the acquisition of a large percentage of the total planned procurement, DOD

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said that the Office of the Secretary of Defense was undertaking a review to determine what steps might be taken to establish adequate controls to ensure that systems demonstrate acceptable performance before they are produced and deployed.

DOD disagreed with our recommendation for a cost-effectiveness analysis to determine the best approach to provide jammer protection for the F-15E. DOD maintained that the Band 1.5 is not a new program requiring such an analysis. However, the fact that the Band 1.5 has been an unfunded requirement for several years prompts the question of whether the Air Force really considers the Band 1.5 to be high priority for the F-15E. Because of this and the substantial cost remaining to be incurred for the Band 1.5, we continue to believe that a cost-effectiveness analysis should be done to examine other alternatives for adequately protecting the F-15E.

DOD's detailed comments and our evaluation of them are classified and, thus, are not included in this version of the report.

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## Scope and Methodology

We performed our work at the Air Force's F-15 System Program Office, Wright-Patterson Air Force Base, Ohio; Directorate of Electronic Combat, and Directorate of Operational Test & Evaluation, Office of the Secretary of Defense, Washington, D.C.; Headquarters, U.S. Air Force, Washington, D.C.; Air Combat Command, Langley Air Force Base, Virginia; Air Warfare Center and Development Test Center, Eglin Air Force Base, Florida; Warner Robins Air Logistics Center, Robins Air Force Base, Georgia; and Northrop Electronic Systems Division, Rolling Meadows, Illinois.

In evaluating ALQ-135 performance, we reviewed developmental test results to date. We also discussed the test results and potential performance issues, including those relating to deferral of the Band 1.5, with Air Force representatives responsible for acquiring, testing, using, and logistically supporting the ALQ-135 and DOD officials responsible for oversight of electronic warfare systems acquisition.

Our review was performed from March 1993 through August 1994 in accordance with generally accepted government auditing standards.

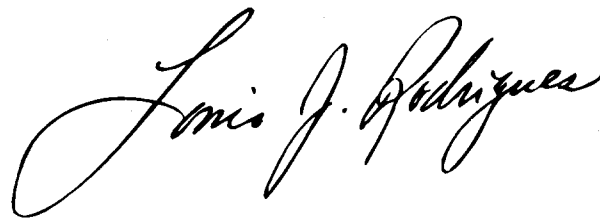
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As arranged with your office, unless you announce the report's contents earlier, we plan no further distribution until 30 days after its issue date. At

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that time, we will send copies to appropriate congressional committees; the Secretaries of Defense and the Air Force; the Chairman of the Joint Chiefs of Staff; and the Director of the Office of Management and Budget.

Please contact me at (202) 512-4841 if you or your staff have any questions concerning this report. Major contributors to this report are listed in appendix I.

A handwritten signature in black ink, reading "Louis J. Rodrigues". The signature is written in a cursive style with a large, looping initial "L".

Louis J. Rodrigues  
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and Production Issues



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